

WHAT IS CLAIMED:

1. A method for producing a cell that contains heterologous nucleic acid, comprising:
 introducing a satellite artificial chromosome (SATAC) into the cell.
- 5 2. ~~The~~ method of claim 1, wherein the cell is an animal cell.
3. ~~The~~ method of claim 2, wherein the cell is a mammalian cell.
4. The method of claim 1, wherein the SATAC is a plant artificial chromosome.
5. ~~The~~ method of claim 1, wherein the SATAC is a mammalian artificial chromosome.
- 10 6. The method of claim 1, wherein the cell is a plant cell.
7. The method of claim 6, wherein the SATAC is a plant artificial chromosome.
8. ~~The~~ method of claim 6, wherein the SATAC is a mammalian artificial chromosome.
- 15 9. The method of claim 1, wherein the SATAC is introduced by a method selected from direct DNA transfer or uptake, electroporation, lipofection, nuclear microinjection, liposome mediated transfer, microprojectile bombardment, polycation-mediated transfer and microcell fusion.
- 20 10. The method of claim 1, wherein the SATAC is introduced by a method selected from microinjection, nuclear transfer, electrofusion, projectile bombardment and lipid-mediated transfer systems.
11. ~~The~~ method of claim 1, wherein the SATAC is produced by a method, comprising:
 introducing a DNA fragment into a cell, wherein the DNA fragment comprises a selectable marker;
 growing the cell under selective conditions to produce cells that have incorporated the DNA fragment into their genomic DNA; and
 selecting a cell that comprises a satellite artificial chromosome (SATAC).
- 25 30

12. The method of claim 11, wherein the DNA fragment is introduced into or adjacent to an amplifiable region of a chromosome in the cell.

13. The method of claim 12, wherein the amplifiable region
5 comprises rDNA.

14. The method of claim 12, wherein the amplifiable region comprises heterochromatin.

15. The method of claim 11, wherein the DNA is introduced into pericentric heterochromatin in a chromosome of the cell.

10 ~~16.~~ 16. The method of claim 11, wherein the cell is a mammalian cell or a plant cell.

17. The method of claim 11, wherein the method for producing the SATAC further comprises isolating the SATAC.

15 18. The method of claim 11, wherein in the method for producing the SATAC, the DNA fragment comprises a sequence of nucleotides that targets the fragment to the heterochromatic region of a chromosome.

19. The method of claim 18, wherein the targeting sequence of nucleotides comprises satellite DNA.

20 ~~20.~~ 20. The method of claim 12, wherein, in the method for producing the SATAC, the cell is a mammalian cell, a plant cell, a fish cell, an insect cell, a reptilian cell, and amphibian cell, an arachnid cell or a rodent cell.

25 21. The method of claim 1, wherein the SATAC is an isolated substantially pure SATAC.

22. The method of claim 1, wherein the SATAC is a megachromosome, comprising about 50 to about 450 megabases (Mb).

23. The method of claim 1, wherein the SATAC is a megachromosome, comprising about 250 to about 400 Mb.

30 24. The method of claim 1, wherein the SATAC is a megachromosome, comprising about 150 to about 200 Mb.

25. The method of claim 1, wherein the SATAC is a megachromosome, comprising about 90 to about 120 Mb.

26. The method of claim 1, wherein the SATAC is a megachromosome, comprising about 15 to about 60 Mb.

5 27. The method of claim 1, wherein the cell is an embryonic cell.

28. The method of claim 1, wherein the cell is an embryonic stem cell.

29. The method of claim 4, wherein the plant is tobacco, rice, maize, rye, soybean, Brassica napus, cotton, lettuce, potato, tomato or
10 arabidopsis.

30. The method of claim 6, wherein the plant is tobacco, rice, maize, rye, soybean, Brassica napus, cotton, lettuce, potato, tomato or arabidopsis.

31. The method of claim 1, wherein the SATAC comprises
15 nucleic acid encoding a gene product or a plurality of gene products.

32. The method of claim 31, wherein the gene products comprise a biosynthetic pathway.

33. The method of claim 2, wherein the animal is a mammal, bird, fowl, fish, invertebrate, vertebrate, reptile or insect.